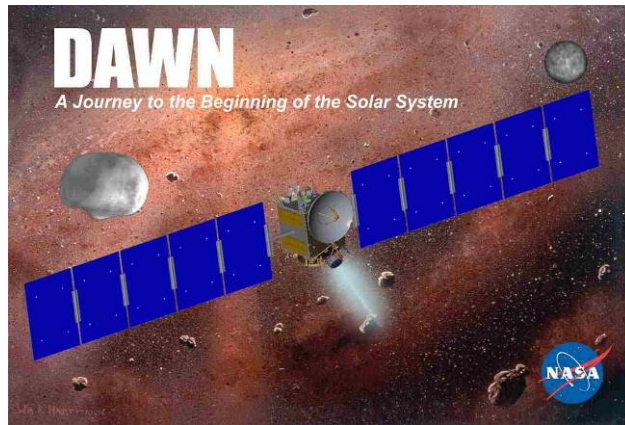


# DAWN MISSION EDUCATION AND PUBLIC OUTREACH: DISSEMINATION DATA REPORT OCTOBER 2005 – JUNE 2007



Submitted to:

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Cover credit: Background painting, "A cocoon nebula, perhaps the primordial solar nebula" by William K. Hartmann. Courtesy of UCLA.

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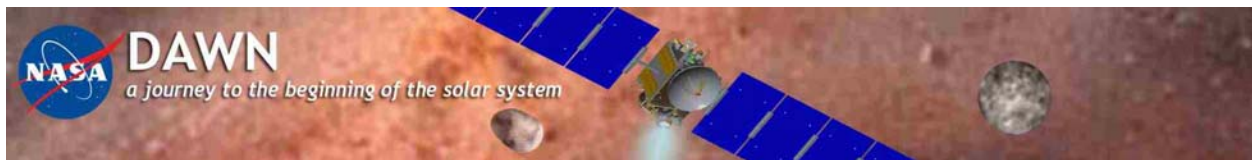
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## INTRODUCTION

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As part of its Discovery Program, NASA awarded funding for the Dawn mission in December 2001. Dawn, the first mission to the Main Asteroid Belt, will investigate Ceres and Vesta, two of the largest protoplanets remaining intact since their formation. The mission will address the role of size and water in determining the evolution of the planets by measuring their mass, shape, volume, and spin rate with imagery and gravitational analysis of the spacecraft motion. Through this investigation, scientists aim to characterize the conditions and processes of the solar system's earliest epoch.<sup>1</sup> Dawn begins its trek with a launch in fall of 2007. The craft will travel four years before it reaches Vesta and another two years to reach Ceres with an end of mission date of 2015.

Dawn E/PO consists of a national team of Education and Public Outreach (E/PO) specialists from the University of Maryland, New Roads School (CA), and Mid-continent Research for Education and Learning (McREL) that develop and disseminate high quality educational resources and materials in support of NASA's Dawn Mission. Dawn E/PO delivers emerging technology and scientific knowledge to the public, to classroom teachers and students, and to informal educators and participants. Through the Dawn E/PO Web site, students, educators, and the public engage in age-appropriate mission activities that include, for example, analyzing images for cratering, doing photometry on images to produce light curves, and discussing with mission scientists the importance of Vesta and Ceres to our understanding of solar system origins.

A central goal of the E/PO program is to reach broad target audiences through high quality products and dissemination mechanisms. Dawn's target audiences include a.) educators (teachers and students, K–Post Secondary); b.) general public members (businesses, parents, politicians, adult learners, and retired); c.) media journalists<sup>2</sup> (national and local, broadcast, print, trade publications, Internet, instructional TV, radio and public service announcements); d.) informal educators (science museums/centers, arts community, speakers bureaus, youth programs, and service clubs); and e.) disadvantaged and underserved populations. E/PO team members reach these audiences primarily through the Dawn Web site, conference presentations, professional development workshops, a quarterly e-newsletter, and publications.

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<sup>1</sup> Dawn: A Journey to the Beginning of the Solar System (2002). The online site for the Dawn mission. Retrieved from the World Wide Web, June 5, 2003, <http://www-ssc.igpp.ucla.edu/dawn/>.

<sup>2</sup> Media requests are deferred to JPL media relations, however Dawn E/PO provides press packets and resources for media professionals via the Dawn mission Web site.

## EVALUATION DESIGN

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The evaluation of the Dawn E/PO program encompasses all aspects of outreach including dissemination and visibility efforts, product development, and impacts on target audiences. Given changes in the mission timeframe and funding, this data report only focuses on dissemination and visibility efforts for two time periods: October 2005-September 2006 and October 2006 – June 2007. As such, this report addresses the extent to which target audiences access and use the Dawn E/PO materials and resources as well as their perceptions of the E/PO resources. The primary data sources for this report include the Dawn E/PO Web site and Web-site survey as well as internal documentation of presentations, workshops, publications and material dissemination.

The 2008 annual report will consist of a full presentation of evaluation findings including dissemination and visibility data, pilot and field test feedback, and impacts on target audiences.

## FINDINGS: Outreach Dissemination and Visibility

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E/PO team members provide access to materials, resources, and information regarding the Dawn mission through various means. During this reporting period, outreach efforts focused on promoting visibility through the Dawn mission Web site, presentations and displays at educational and public events, and dissemination of print materials such as business cards, bookmarks, fact sheets, and posters.

### CONFERENCES, PRESENTATIONS, AND WORKSHOPS.

During the project period, E/PO team members represented the Dawn mission at several educator events, including the pre-launch Dawn Educator Conference in Florida.

During the October 2005 to September 2006 reporting period, staff gave a total of 17 presentations on the Dawn mission at conferences of the Colorado Science Teachers Association, National After School Association, and National Science Teachers Association, as well as at a NASA Earth and Space Science Education Workshop. Over 230 educators attended these presentations in total. Topics for the presentations included “Science and Story Telling,” “The Dawn Mission and You,” and “During 2005-2006 team



*Participants at a Dawn workshop session in Florida.*

members also disseminated information about the Dawn mission at booths at the Denver Museum of Nature and Science Educator Night, the JPL Open House, and conferences of the American Association of Science and Technology Centers, National Science Teachers Association, and Kansas Association of Teachers of Science.

From October 2006 through June 2007 E/PO team members gave 27 presentations on the Dawn mission, attended by almost 2,800 people. The attendees included 92 K-12 teachers, 236 K-12 students, 9 higher education faculty, 22 higher education students, 651 other members of the education community, and 1,761 members of the general public. Venues for these presentations included museums, observatories, elementary schools, universities, the National Science Teachers Association conference, state science teacher association conferences, the National After School Association conference, and a Dawn Educator workshop.



*Participants at the Dawn Mission Educator Conference.*

E/PO members collected feedback from 82 participants attending two outreach events in 2007: The Denver Museum of Nature and Science and the Dawn Educator Conference in Florida. Participants at both events rated the overall quality of the sessions as “excellent” (74%) or “good” (18%). The majority of attendees also gave high-quality ratings to the materials (96% “excellent” or “good”) and the presentations and activities (93% “excellent” or “good”). Eighty percent of participants indicated that they learned effective

instructional practices to use in their work “to a great extent” or “to much extent.” Figure 1 below presents participants’ rating regarding the extent to which the presentations 1) increased their awareness of the Dawn mission and NASA missions in general, 2) enhanced their understanding about the Dawn mission and space science, 3) increased their interest in NASA missions and space science, and 4) increased their understanding of how to engage students in real-life contexts. As shown in the figure, the presentations positively impacted participants’ awareness, interest, and understanding of the Dawn mission, NASA missions in general, and space science. As one participant wrote, “I have attended several science workshops this summer. This, by far, was the most interesting! I have so much to share with my teaching team and with my students. Thank you!” Another respondent shared, “Thank you so much, as an educator I learned so much about our space missions that I was unaware of before, I have more respect for your space missions than I did before this workshop.”

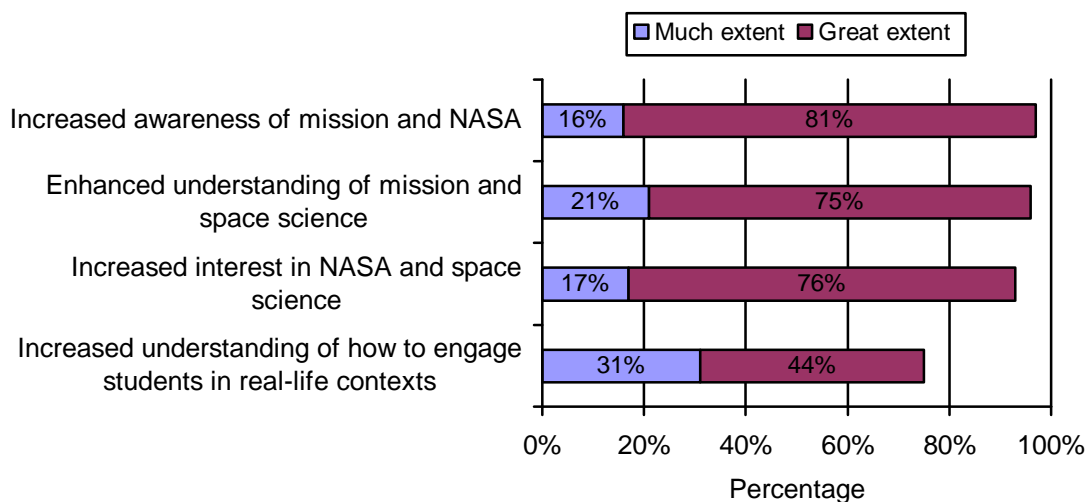
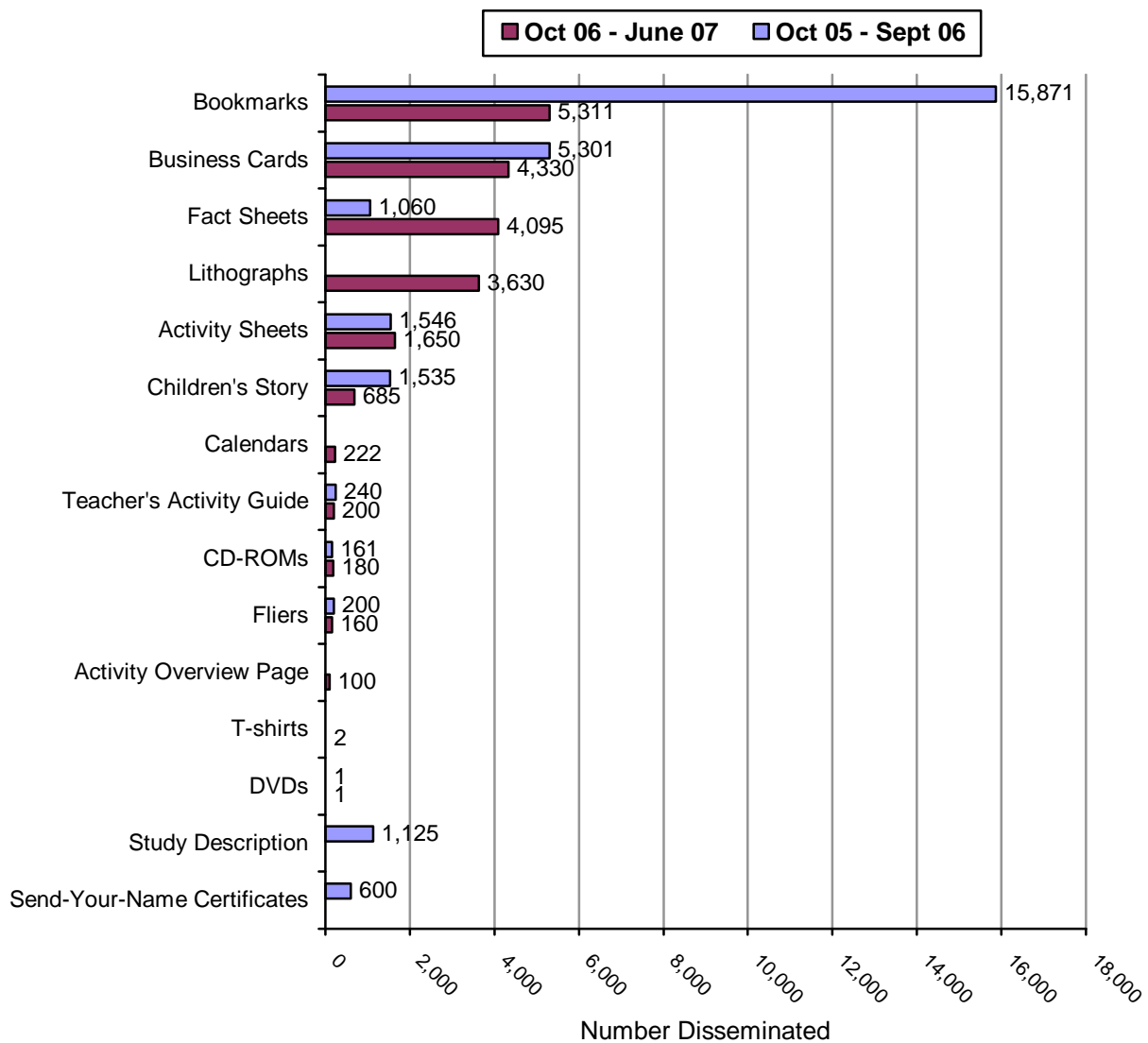


Figure 1. Feedback from event participants.

## OUTREACH MATERIALS

E/PO team members disseminate materials and resources ranging from Dawn Mission bookmarks to the Dawn Mission e-newsletter, and from mission-related activities for young children to standards-based curriculum modules for teachers and students. Figure 2 presents quantities of project materials that were disseminated during the past two reporting periods. It is important to note that the reporting period from October 2005 – September 2006 accounts for 12 months whereas the reporting period from October 2006 – June 2007 only includes 9 months. Additionally, caution is warranted in making any comparisons between these reporting periods given changes in resource allocations leading up to launch in 2007.





**Figure 2.** Materials disseminated to target audiences.

From October 2005 to September 2006 over 5,000 Dawn Mission business cards and almost 16,000 bookmarks were disseminated to educators across the country. Also distributed during 2005-06 were over 1,500 activity sheets and almost as many copies of the children's educational story "Aster's Hoity-Toity Belt," along with over 1,000 field test study descriptions (for recruitment efforts). The 600 certificates represent the number of hard copy certificates printed for participants who input their names on the "Send Your Name to the Asteroid Belt" at a conference or other public event. Certificates were made available for printing electronically for the over 360,000 participants who entered their names from their own computer.

During the nine months from October 2006 to June 2007 over 5,300 bookmarks and 4,300 business cards were distributed. Also disseminated were over 4,000 fact sheets, 3,600 lithographs, and 1,650 activity sheets.

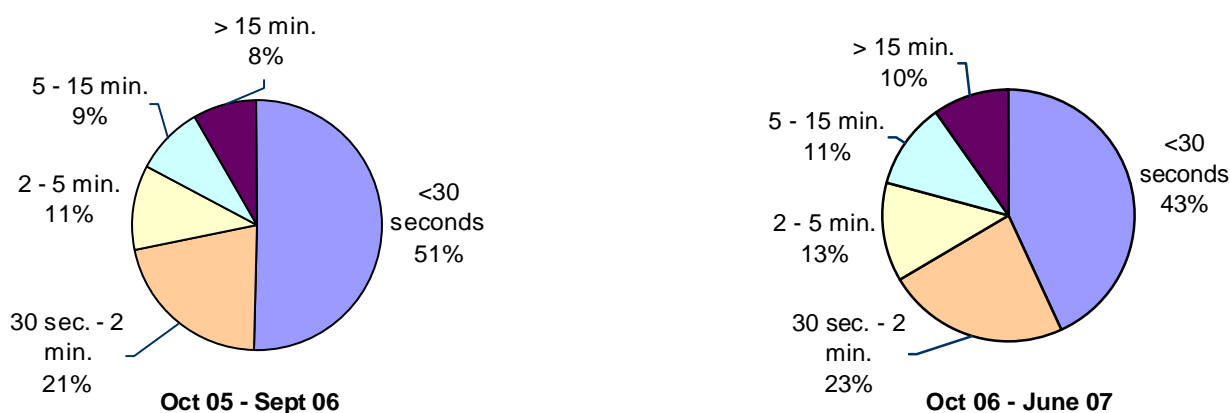


During the 2005-2006 reporting period, team members developed and disseminated monthly Dawn Mission e-newsletters to 943 subscribers. The number of e-newsletter subscribers increased to 2,529 during the 2006-2007 reporting period. Subscribers register for the e-newsletter via the Dawn Mission Web site or by completing a subscription form at professional conferences attended by the Dawn Mission E/PO team.

## DAWN MISSION WEB SITE: USAGE STATISTICS

The site is a comprehensive information source and dissemination mechanism for the Dawn mission. During the 2005-2007 period, team members made a wealth of updates, additions, and enhancements to the Dawn Web site, including timely mission status updates. Some examples of their recent efforts include posting the Press Room page, the Community in Action page, the Dwarf Planet activity, the Dawn feature video, and the Young Engineer feature. Team members thoroughly update Web site pages to reflect new information and revisions on a regular basis.

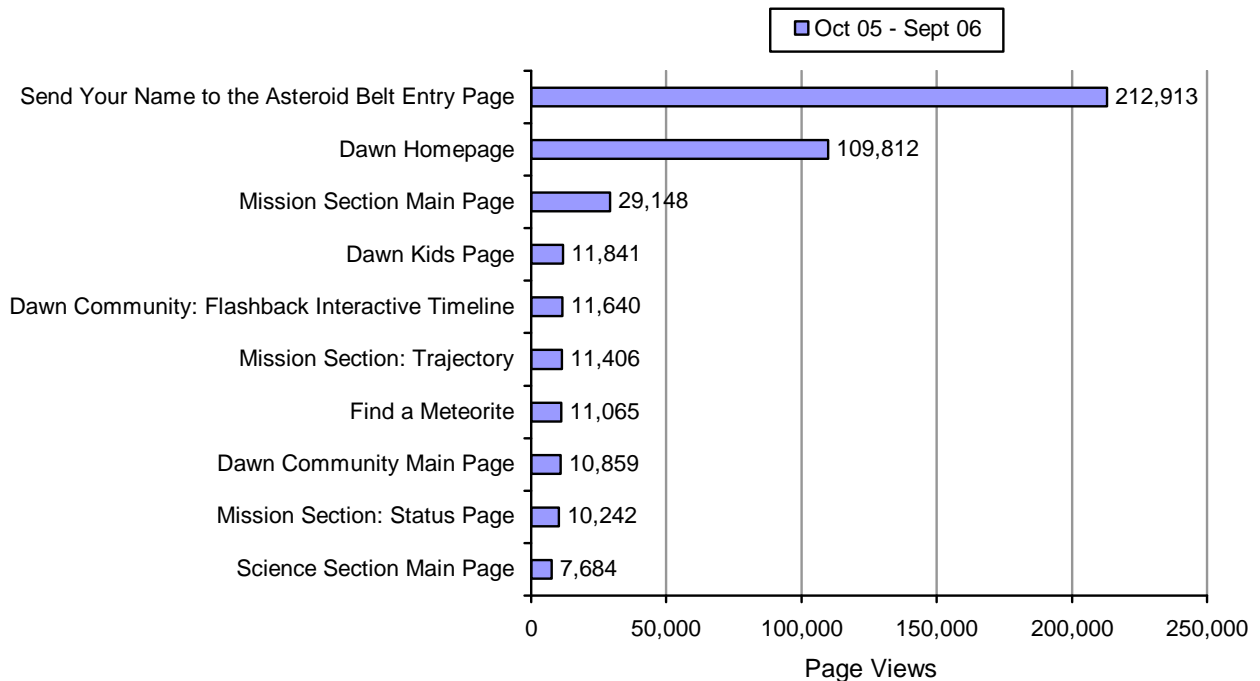
For the 12 months from October 2005 through September 2006, the site received 3,802,639 hits, 811,316 page views, and 26,549 visitor sessions<sup>3</sup>. Comparatively, for the nine months from October 2006 through June 2007 the site received 9,695,961 hits, 988,126 page views, and 94,970 visitor sessions. Almost all visitors (97% in 2005-06, 88% in 2006-07) accessing the Web site were from the United States, although there was also a small amount of activity from Australia, Great Britain, China, Poland, and over 100 other countries. In both reporting periods most visitor sessions lasted less than 30 seconds, slightly less than one quarter were 30 seconds to 2 minutes in length, slightly more than 10% lasted 2 to 5 minutes, and approximately 20% lasted longer than 5 minutes (see Figure 3).



**Figure 3.** Duration of visitor sessions on the Dawn Web site from entry to exit.

<sup>3</sup> A visitor session is a session of activity (all hits) for one visitor of a web site.

Figure 4 shows the ten Web pages that received the most page views of the Dawn Web site during the 2005-2006 reporting period. The “Send Your Name to the Asteroid Belt” page, where members of the public could sign up to have their names included on a computer chip installed on the Dawn spacecraft, received the most views (nearly 213,000) during 2005-06, almost twice as many as the Dawn Web site homepage (almost 110,000). Over 360,000 names were received to fly onboard the spacecraft. The Mission section main page received the third most views during 2005-06, with over 29,000.



**Figure 4.** The ten most frequently viewed pages on the Dawn Web site, 2005-06.

Figure 5 shows that during 2006-07 the homepage received the most activity (nearly 250,000 views), followed by the “Send Your Name” page (almost 118,000), and then the Mission section main page (almost 51,000). The other most popular pages varied between the two reporting periods.

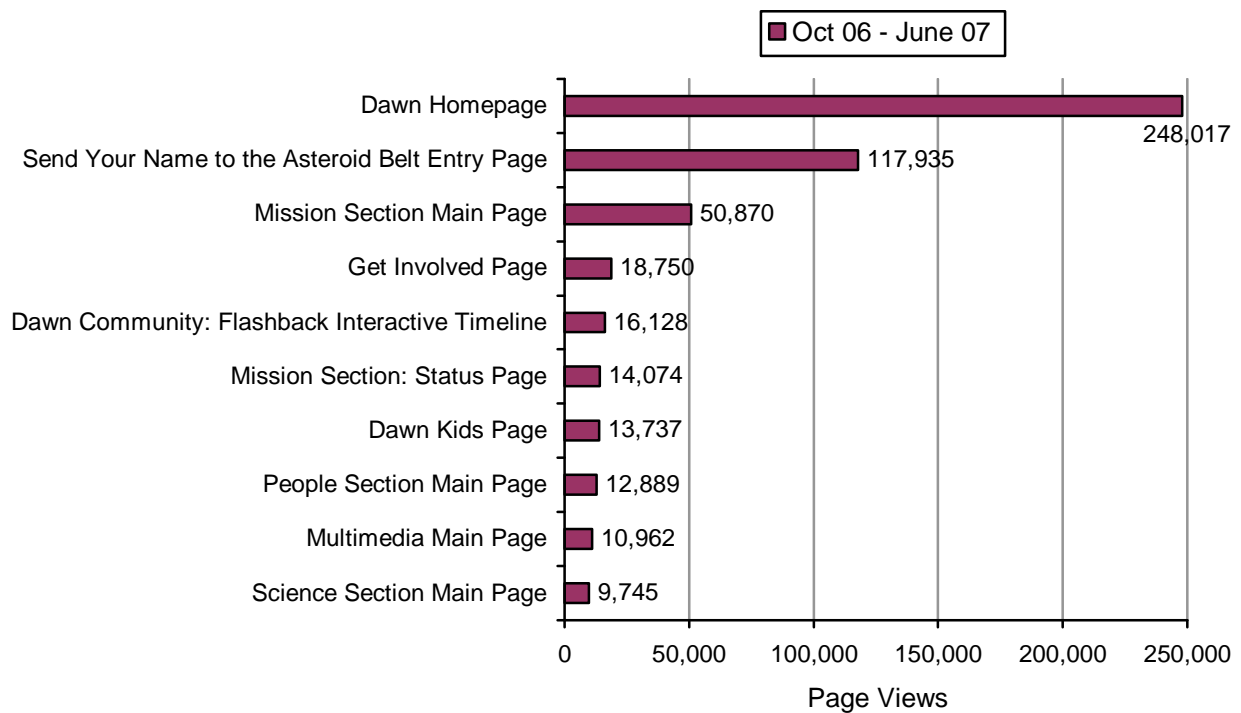
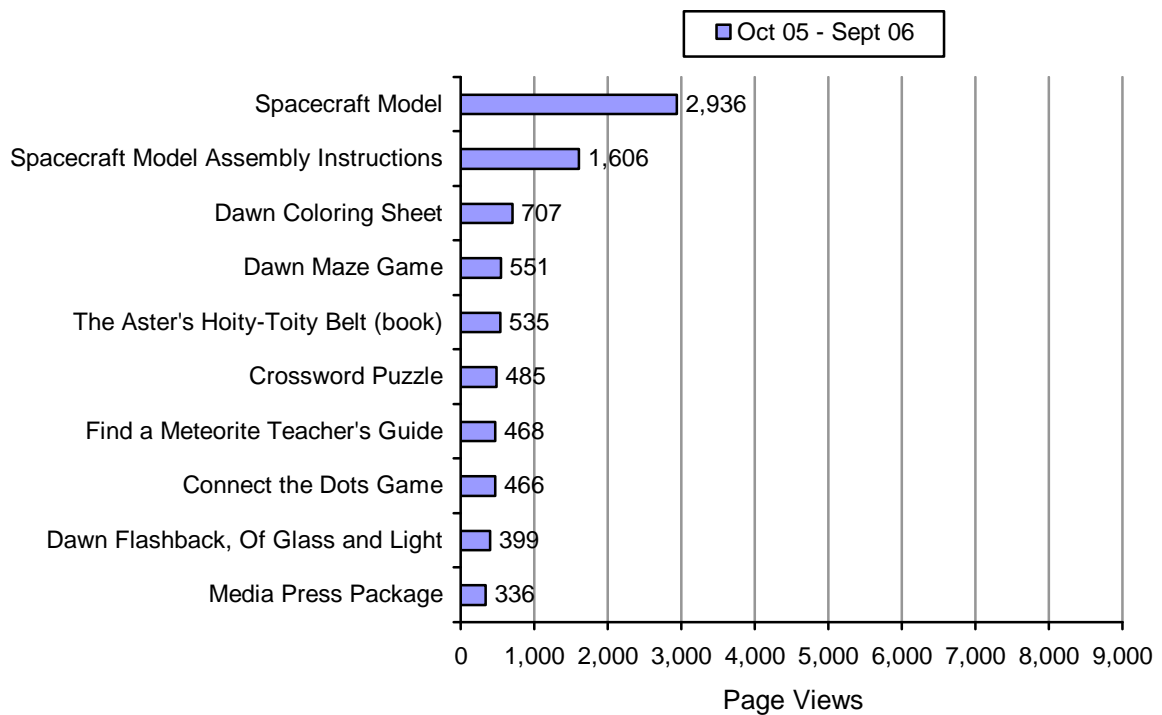
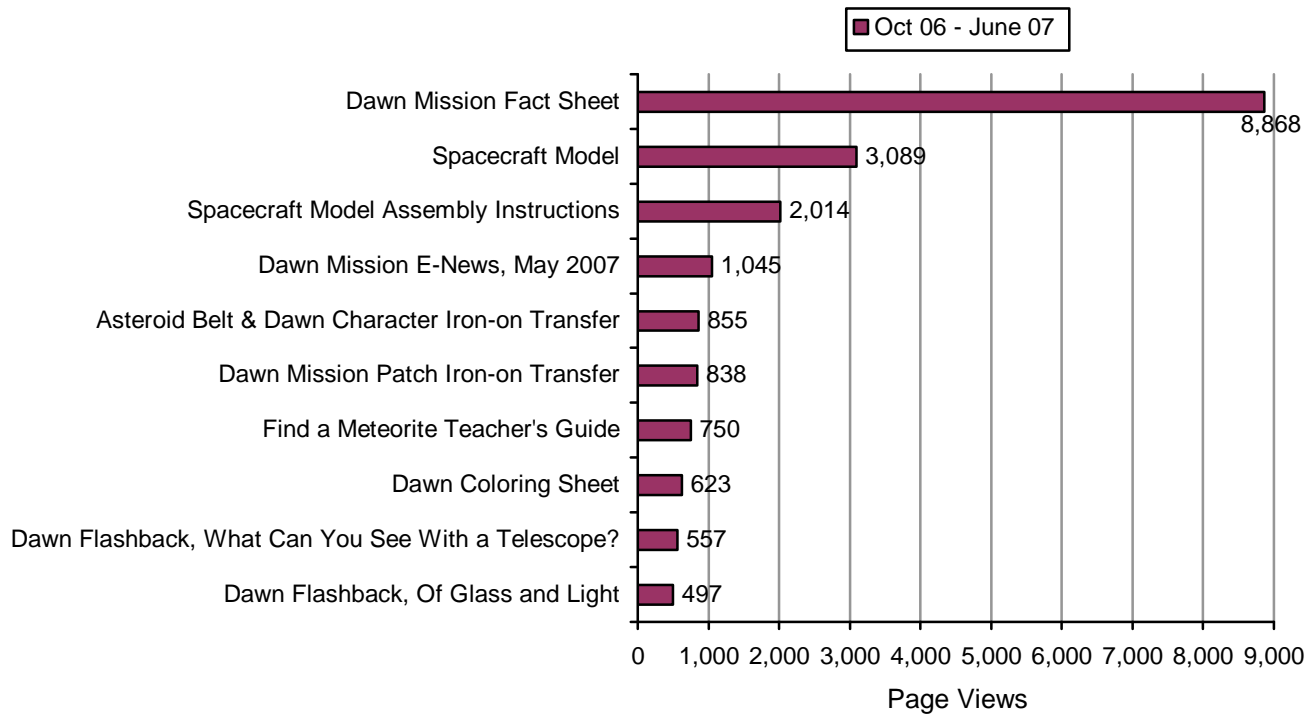


Figure 5. The ten most frequently viewed pages on the Dawn Web site, 2006-07.

During the October 2005 to September 2006 reporting period, the Spacecraft Model pattern and assembly instructions were the two most popular PDF documents, receiving a combined total of over 4,500 views (Figure 6, below). From October 2006 to June 2007 the most popular PDF document was the Dawn Mission Fact Sheet, which was viewed almost 9,000 times (Figure 7). The Spacecraft Model pattern and instructions were the next most popular PDF documents during 2006-07, being viewed over 5,000 times combined.

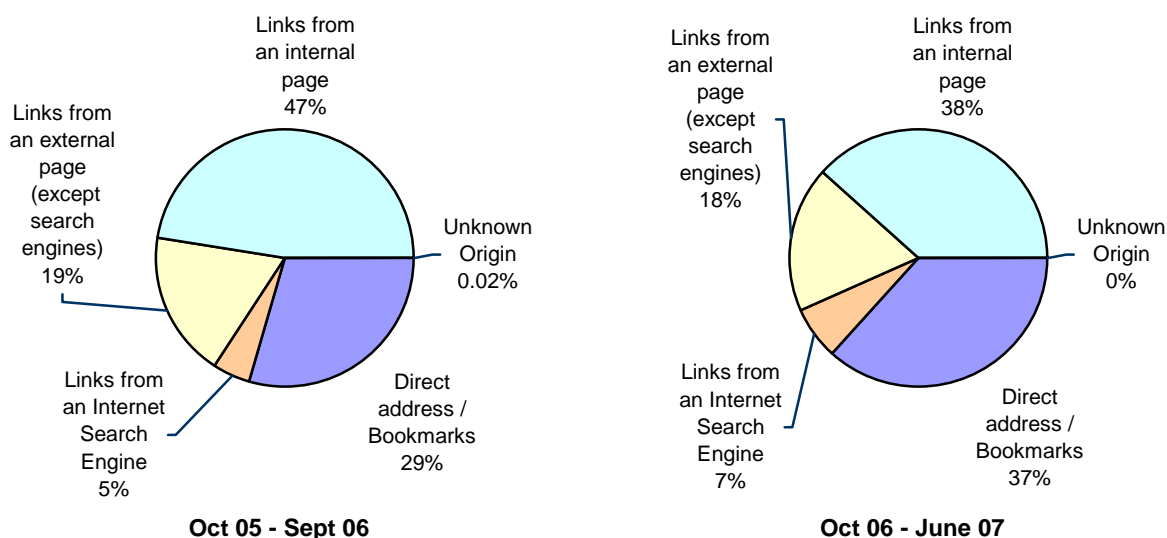


**Figure 6.** The ten most frequently viewed PDF pages on the Dawn Web site, 2005-06.



**Figure 7.** The ten most frequently viewed PDF pages on the Dawn Web site, 2006-07.

Target audiences can learn about the Dawn Web site through the Dawn newsletters; all project materials, which include the Web address; search engines; and links from other space science Web sites. Links from direct address or bookmarks accounted for 29% of page views of the Web site in 2005-06 and 37% during 2006-07. Almost half (47%) of page views originated from another Dawn Web site page in 2005-06, compared to 38% in 2006-07. During both reporting periods approximately 20% of page views originated from external Web sites and 5% originated from an Internet search engine (see Figure 8).



**Figure 8.** Web users' method of accessing the Dawn Web site.

### **DAWN MISSION WEB SITE: USER EVALUATION SURVEY**

A Dawn Mission Web Site Evaluation online survey was developed and placed on the Web site to assess user perceptions of its quality and utility. The data reported in the following sections is divided according to the 2005-2006 timeframe and the 2006-2007 timeframe. It is important to note three distinct differences that make comparing these two timeframes inappropriate: (1) The time periods are not of equal length, (2) the latter time period led up to the original launch date, which increased visibility and outreach efforts, and (3) more and modified resources were available on the site during the second timeframe.

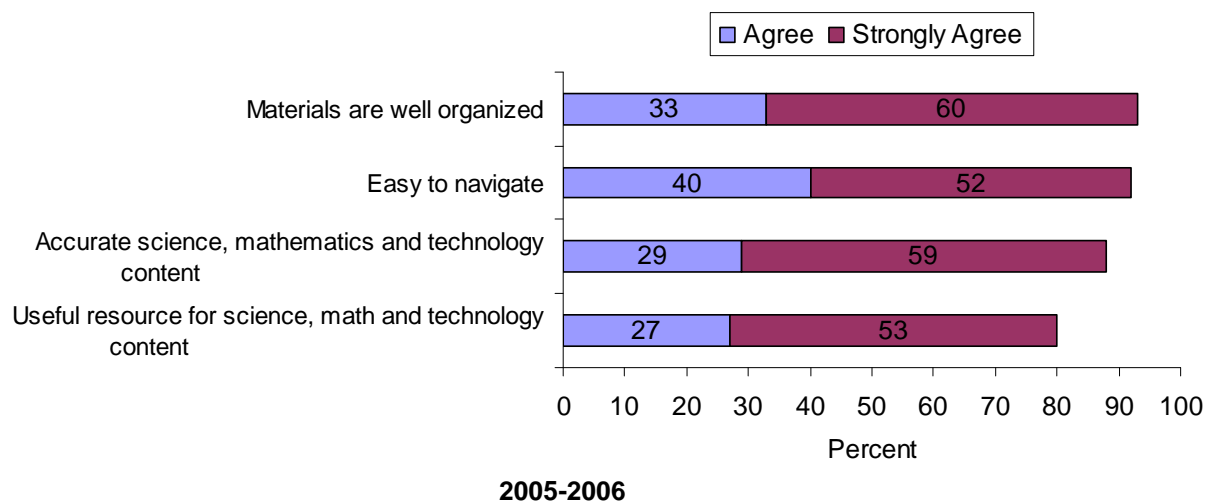
Of the 55 users who completed the survey during the October 2005 to September 2006 reporting period, 47% identified themselves as members of the general public, 20% as educators, 27% as students, and 6% as members of the science community. During the October 2006 to June 2007 reporting period the survey received 727 responses. Of these, 31% identified as members of the general public, 13% as educators, 48% as students, 8% as scientists, and 1% did not choose a role.

Respondents were asked to indicate how they learned about the Dawn Web site (Table 1, below). During both reporting periods the largest percentage (46% in 2005-06 and 29% in 2006-07) found the Dawn Web site through a link on another Web page. A larger percentage of respondents in 2006-07 than 2005-06 learned about the Web site through Dawn Mission materials such as business cards and the e-newsletter.

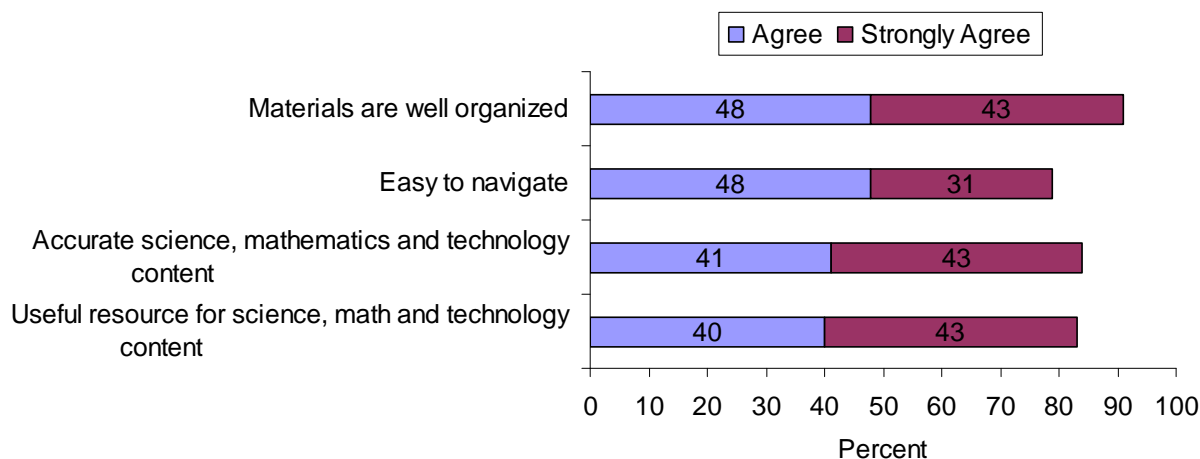
**Table 1.** How respondents to Web site evaluation learned about the Dawn Mission Web site.

<b>I found the Dawn Web site through: (check all that apply)</b>	<b>Percent (Number)</b>	
	<b>2005-06</b>	<b>2006-07</b>
Dawn Mission Business Card	4% (2)	15% (107)
Dawn Mission Electronic Newsletter	11% (6)	19% (135)
Other Dawn Mission print materials	6% (3)	13% (97)
A conference or workshop I attended	6% (3)	9% (64)
Link from another Web site	46% (25)	29% (209)
Other	36% (20)	24% (176)

The Web site survey contains several questions regarding the utility of the Dawn Web site. Respondents were asked to indicate their level of agreement on a five-point scale (5=strongly agree, 4=agree, 3=neither agree nor disagree, 2=disagree, 1=strongly disagree) with the following statements: “In my opinion, this website: a) has materials that are well organized”, “b) is easy to navigate,” “c) contains accurate science, mathematics, and technology content,” and “d) is a useful resource for science, mathematics, and technology content.” Figures 9 & 10 below illustrate that during both reporting periods over 75 percent of respondents agreed or strongly agreed with each of the utility statements.



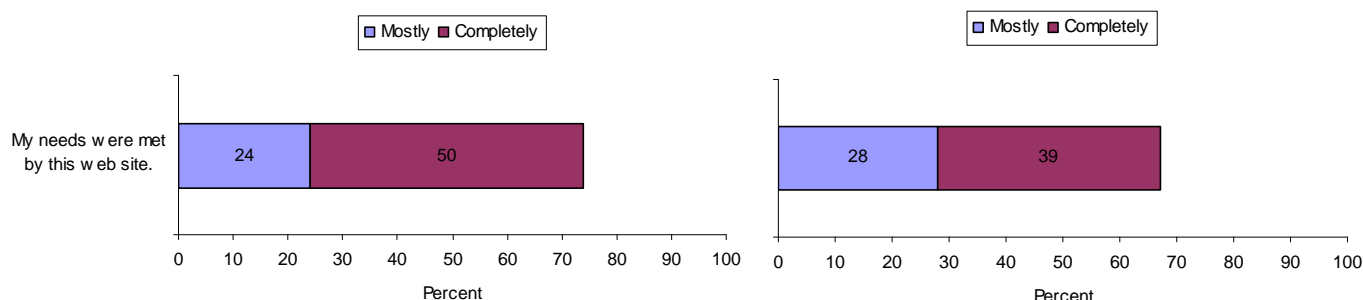
**Figure 9.** Percent of respondents agreeing or strongly agreeing with Web site utility statements, 2005-2006.



**2006-2007**

**Figure 10.** Percent of respondents agreeing or strongly agreeing with Web site utility statements, 2006-2007.

The survey included an item asking respondents if the Dawn Web site had met their needs “completely,” “mostly,” “somewhat,” or “not at all.” The majority of respondents in both years indicated that the Web site had met their needs mostly or completely (Figure 11).



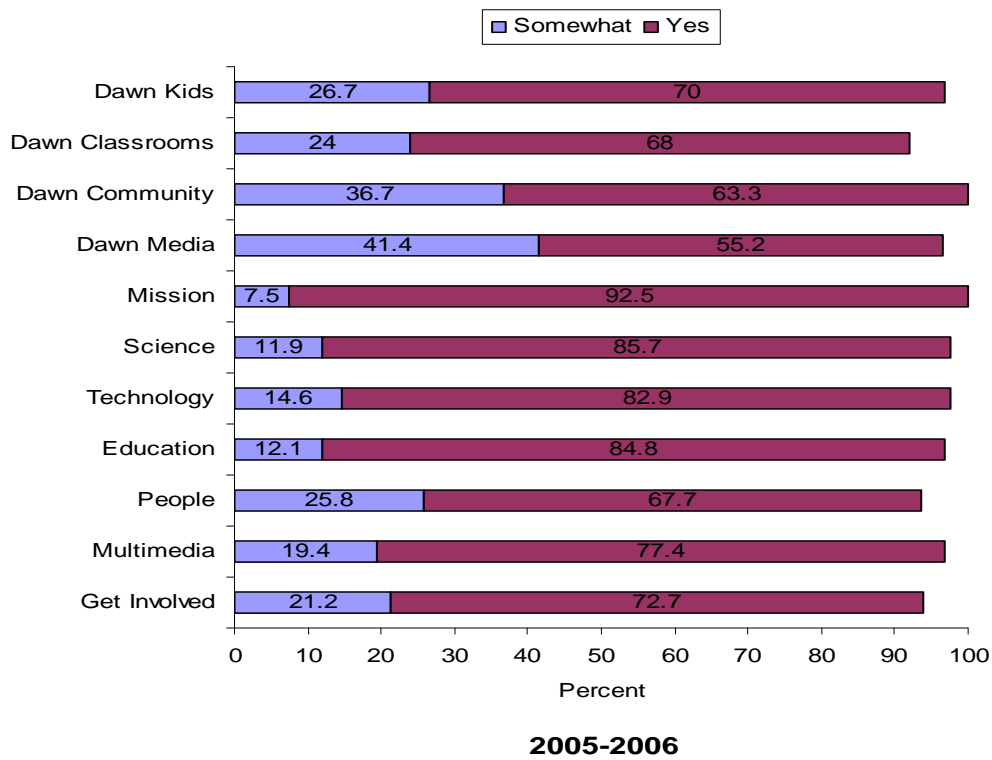
**2005-2006**

**2006-2007**

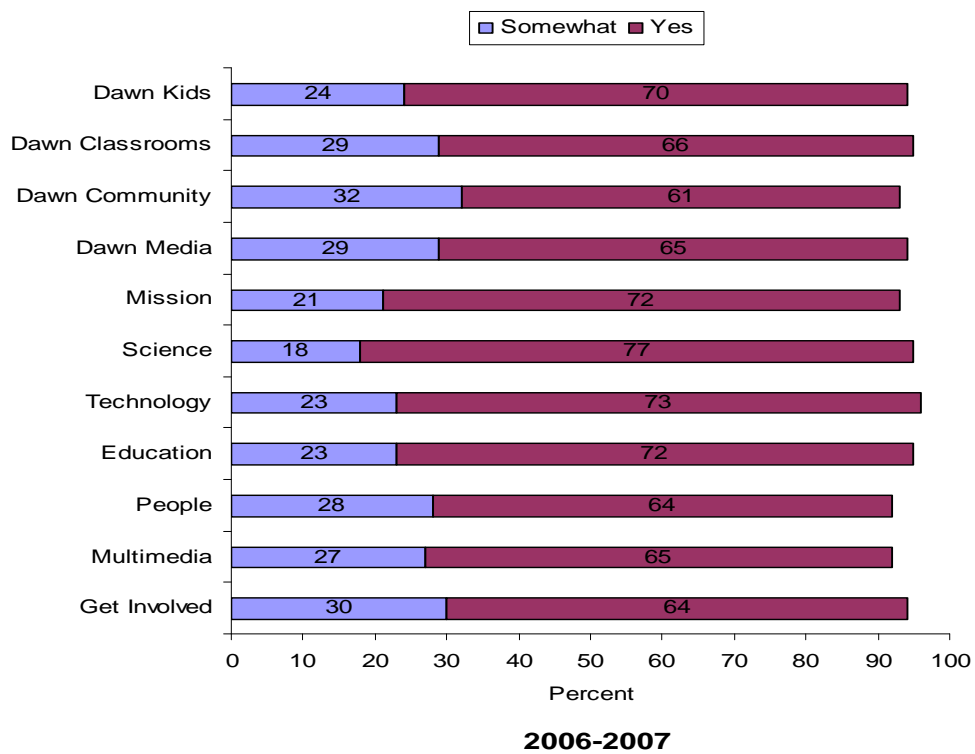
**Figure 11.** Percent of respondents reporting Web site meets needs

Respondents were also asked whether or not each of the major sections of the Dawn Web site were useful or not. Respondents could answer “Yes,” “Somewhat,” or “No.” Figures 12 & 13 illustrate that during both reporting periods the overwhelming majority of respondents indicated finding all sections of the Web site to be at least somewhat useful.



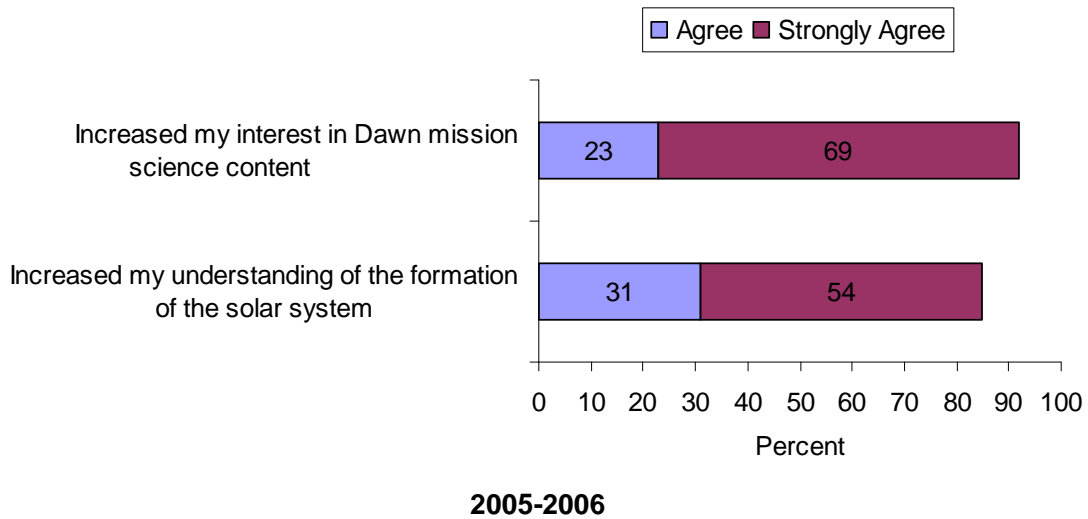


**Figure 12.** Percent of respondents reporting on utility of Web site sections, 2005-2006.

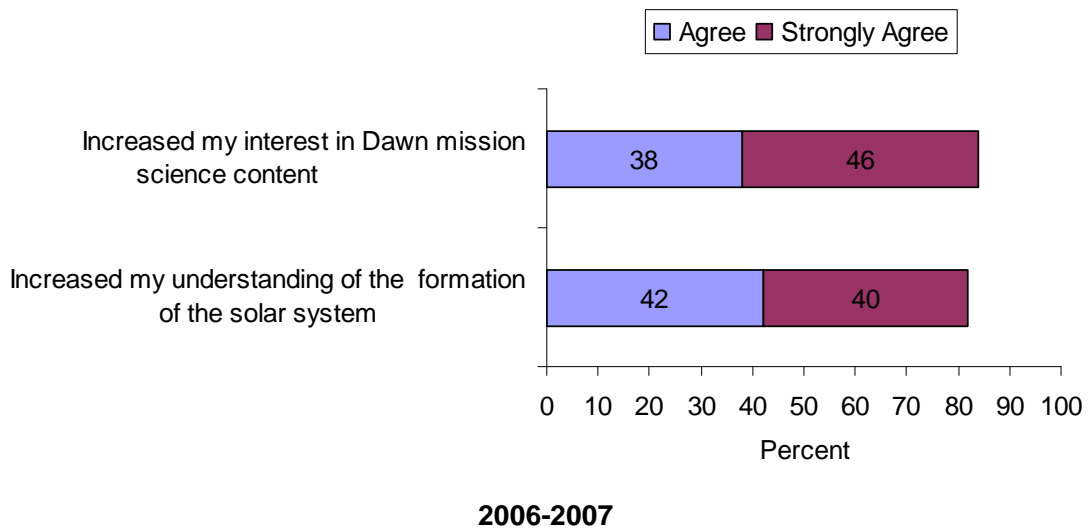


**Figure 13.** Percent of respondents reporting on utility of Web site sections, 2006-2007.

Survey respondents answered questions regarding how the Web site affected their interest in and awareness of science-related issues. Respondents were asked to indicate their level of agreement with the following statements, using the same five-point scale mentioned previously: “In my opinion, this website: a) increased my interest in Dawn mission science content,” and “b) increased my understanding of the formation of the solar system.” As Figures 14 & 15 illustrate, in both reporting periods over 80% of respondents “agreed” or “strongly agreed” with the above statements.



**Figure 14.** Percent of respondents reporting increased interest and understanding, 2005-2006.

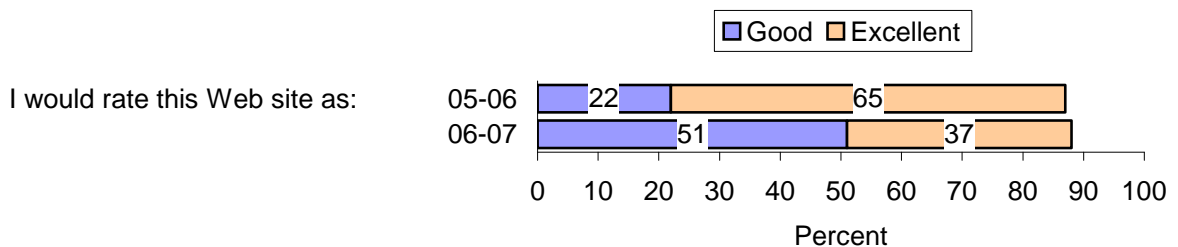


**Figure 15.** Percent of respondents reporting increased interest and understanding, 2006-2007.

The survey included some items about the overall quality of the Web site. When asked if they would recommend the Dawn Mission Web site to colleagues, over 90% of respondents in both reporting periods indicated that they would (Figure 16). Respondents were next asked to rate the Web site as “excellent,” “good,” “average,” “fair,” or “poor.” In both reporting periods almost 90% of respondents rated the site as excellent or good (Figure 17).



**Figure 16.** Percent of respondents agreeing or disagreeing that they would recommend the site to colleagues.



**Figure 17.** Percent of respondents rating the Web site as excellent or good.

Lastly respondents were asked to indicate if they would like to see more of several items on the Dawn Web site (Table 2). Of the four items respondents could choose (interviews, simulations, technical data, and Web links), the two most often requested by 2005-06 respondents were simulations (40%) and technical data (49%). The item most often requested by 2006-07 respondents was interviews (34%).

**Table 2:** Items respondents would like to see more of on the Dawn Mission Web site

<b>I'd like to see more: (check all that apply)</b>	<b>Percent (Number)</b>	
	<b>2005-06</b>	<b>2006-07</b>
Interviews	22% (12)	34% (245)
Simulations	40% (22)	29% (213)
Technical data	49% (27)	29% (208)
Web links	13% (7)	20% (148)
Other	15% (8)	6% (44)

## **SUMMARY**

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During the project periods for this report, October 2005 through September 2006 and October 2006 through June 2007, E/PO dissemination efforts focused on enhancing the Web site and its content, promoting educator awareness of and interest in the Dawn education materials, and reaching audiences through conferences and public events.

The Dawn Web site experienced a significant increase in visitor sessions from 26,549 (October 2005 – September 2006) to 94,970 (October 2006 – June 2007). Most frequently, people accessing the Dawn Web site viewed the Homepage of the Mission pages and the Send Your Name to the Asteroid Belt pages. Almost all visitor sessions originated from the United States, although the site continues to demonstrate a growing number of international visitors.

Findings indicate that information regarding the Dawn mission continues each year to reach larger and varied audiences. Across all dissemination venues, findings reveal that outreach efforts continue to heighten visibility of the mission and increase target audiences' awareness, interest and understanding of the mission, NASA, and space science. Participant feedback on the Web site and E/PO presentations suggests that these efforts are of high quality and utility.